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=> d que sta l13

L11 STR

P---C---C---P

1 2 3 4

NODE ATTRIBUTES:

NSPEC IS R AT 1

NSPEC IS R AT 4

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED

NUMBER OF NODES IS 4

STEREO ATTRIBUTES: NONE

L13 179 SEA FILE=REGISTRY SSS FUL L11

100.0% PROCESSED 81481 ITERATIONS

179 ANSWERS

SEARCH TIME: 00.00.01

=> b hcap

FILE 'HCAPLUS' ENTERED AT 16:11:09 ON 10 AUG 2006  
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FILE COVERS 1907 - 10 Aug 2006 VOL 145 ISS 7  
 FILE LAST UPDATED: 9 Aug 2006 (20060809/ED)

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This file contains CAS Registry Numbers for easy and accurate  
 substance identification.

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L33 ANSWER 1 OF 3 HCAPLUS COPYRIGHT 2006 ACS on STN  
 AN 2004:287803 HCAPLUS  
 DN 140:310272  
 ED Entered STN: 08 Apr 2004  
 TI Process for the hydroformylation of an ethylenically unsaturated compound  
 IN Drent, Eit; Van Ginkel, Roelof; Jager, Willem  
 Wabe  
 PA Shell Internationale Research Maatschappij B.V., Neth.  
 SO PCT Int. Appl., 28 pp.  
 CODEN: PIXXD2  
 DT Patent  
 LA English  
 IC ICM B01J-0031/24  
 ICS B01J-0027/08; B01J-0031/02; C07F-0009/6568; C07F-0015/00;  
 C07C-0045/50  
 CC 67-1 (Catalysis, Reaction Kinetics, and Inorganic Reaction Mechanisms)  
 Section cross-reference(s): 23

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO2004028689	A2	20040408	2003WO-EP50654	20030924 <--
WO2004028689	A3	20040729		
W:	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW			
RW:	GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG			
CA---2500095	AA	20040408	2003CA-2500095	20030924 <--
AU2003299066	A1	20040419	2003AU-0299066	20030924 <--
US2004167362	A1	20040826	2003US-0670105	20030924 <--
EP---1542798	A2	20050622	2003EP-0798198	20030924 <--
R:	AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK			
CN---1684769	A	20051019	2003CN-0823006	20030924 <--
JP2006500415	T2	20060105	2004JP-0539074	20030924 <--
ZA2005002080	A	20050912	2005ZA-0002080	20050311 <--
PRAI 2002EP-0256696	A	20020926	<--	
2003WO-EP50654	W	20030924		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
WO 2004028689	ICM	B01J-0031/24
	ICS	B01J-0027/08; B01J-0031/02; C07F-0009/6568; C07F-0015/00; C07C-0045/50
	IPCI	B01J0031-24 [ICM,7]; B01J0031-16 [ICM,7,C*]; B01J0027-08 [ICS,7]; B01J0027-06 [ICS,7,C*]; B01J0031-02 [ICS,7]; C07F0009-6568 [ICS,7]; C07F0009-00 [ICS,7,C*]; C07F0015-00 [ICS,7]; C07C0045-50 [ICS,7]; C07C0045-00 [ICS,7,C*]
	IPCR	B01J0031-16 [I,C*]; B01J0031-24 [I,A]; B01J0031-26

[N,C\*]; B01J0031-28 [N,A]; C07C0045-00 [I,C\*];  
C07C0045-50 [I,A]; C07C0067-00 [I,C\*]; C07C0067-347  
[I,A]; C07F0009-00 [I,C\*]; C07F0009-6568 [I,A]  
ECLA B01J031/24; C07C045/50; C07C067/347+69/716;  
C07C067/347+69/675; C07F009/6568C  
CA---2500095 IPCI B01J0031-24 [ICM,7]; B01J0031-16 [ICM,7,C\*];  
C07F0015-00 [ICS,7]; B01J0031-02 [ICS,7]; B01J0027-08  
[ICS,7]; B01J0027-06 [ICS,7,C\*]; C07C0045-50 [ICS,7];  
C07C0045-00 [ICS,7,C\*]; C07F0009-6568 [ICS,7];  
C07F0009-00 [ICS,7,C\*]  
IPCR B01J0031-16 [I,C\*]; B01J0031-24 [I,A]; B01J0031-26  
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C07C0045-50 [I,A]; C07C0067-00 [I,C\*]; C07C0067-347  
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ECLA B01J031/24; C07C045/50; C07C067/347+69/675;  
C07C067/347+69/716; C07F009/6568C  
AU2003299066 IPCI B01J0031-24 [ICM,7]; B01J0031-16 [ICM,7,C\*];  
B01J0027-08 [ICS,7]; B01J0027-06 [ICS,7,C\*];  
B01J0031-02 [ICS,7]; C07F0009-6568 [ICS,7]; C07F0009-00  
[ICS,7,C\*]; C07F0015-00 [ICS,7]; C07C0045-50 [ICS,7];  
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IPCR B01J0031-16 [I,C\*]; B01J0031-24 [I,A]; B01J0031-26  
[N,C\*]; B01J0031-28 [N,A]; C07C0045-00 [I,C\*];  
C07C0045-50 [I,A]; C07C0067-00 [I,C\*]; C07C0067-347  
[I,A]; C07F0009-00 [I,C\*]; C07F0009-6568 [I,A]  
US2004167362 IPCI C07C0045-49 [ICM,7]; C07C0045-00 [ICM,7,C\*]  
IPCR B01J0031-16 [I,C\*]; B01J0031-24 [I,A]; B01J0031-26  
[N,C\*]; B01J0031-28 [N,A]; C07C0045-00 [I,C\*];  
C07C0045-50 [I,A]; C07C0067-00 [I,C\*]; C07C0067-347  
[I,A]; C07F0009-00 [I,C\*]; C07F0009-6568 [I,A]  
NCL 568/454.000  
ECLA B01J031/24; C07C045/50; C07C067/347+69/675;  
C07C067/347+69/716; C07F009/6568C  
EP---1542798 IPCI B01J0031-24 [ICM,7]; B01J0031-16 [ICM,7,C\*];  
B01J0027-08 [ICS,7]; B01J0027-06 [ICS,7,C\*];  
B01J0031-02 [ICS,7]; C07F0009-6568 [ICS,7]; C07F0009-00  
[ICS,7,C\*]; C07F0015-00 [ICS,7]; C07C0045-50 [ICS,7];  
C07C0045-00 [ICS,7,C\*]  
IPCR B01J0027-06 [I,C\*]; B01J0027-08 [I,A]; B01J0031-02  
[I,A]; B01J0031-02 [I,C\*]; B01J0031-16 [I,C\*];  
B01J0031-24 [I,A]; C07C0045-00 [I,C\*]; C07C0045-50  
[I,A]; C07F0009-00 [I,C\*]; C07F0009-6568 [I,A];  
C07F0015-00 [I,A]; C07F0015-00 [I,C\*]  
CN---1684769 IPCI B01J0031-24 [ICM,7]; B01J0031-16 [ICM,7,C\*];  
B01J0027-08 [ICS,7]; B01J0027-06 [ICS,7,C\*];  
B01J0031-02 [ICS,7]; C07F0009-6568 [ICS,7]; C07F0009-00  
[ICS,7,C\*]; C07F0015-00 [ICS,7]; C07C0045-50 [ICS,7];  
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IPCR B01J0031-16 [I,C\*]; B01J0031-24 [I,A]; B01J0031-26  
[N,C\*]; B01J0031-28 [N,A]; C07C0045-00 [I,C\*];  
C07C0045-50 [I,A]; C07C0067-00 [I,C\*]; C07C0067-347  
[I,A]; C07F0009-00 [I,C\*]; C07F0009-6568 [I,A]  
JP2006500415 IPCI C07C0067-38 [I,A]; C07C0067-00 [I,C\*]; B01J0031-24  
[I,A]; B01J0031-16 [I,C\*]; C07C0069-675 [I,A];  
C07C0069-00 [I,C\*]; C07B0061-00 [N,A]  
FTERM 4G169/AA06; 4G169/AA08; 4G169/BA27A; 4G169/BA27B;  
4G169/BC69A; 4G169/BC72A; 4G169/BC72B; 4G169/BE26A;  
4G169/BE26B; 4G169/BE37A; 4G169/BE37B; 4G169/CB51;  
4G169/FA01; 4H006/AA02; 4H006/AC48; 4H006/BA25;  
4H006/BA35; 4H006/BA44; 4H006/BA47; 4H006/BA81;  
4H006/BE20; 4H006/BE40; 4H006/BN10; 4H006/BT12;  
4H039/CC30; 4H039/CL45  
ZA2005002080 IPCI B01J [ICS,7]; C07C [ICS,7]; C07F [ICS,7]  
IPCR B01J0031-16 [I,C\*]; B01J0031-26 [N,C\*]; C07C0045-00  
[I,C\*]; C07C0067-00 [I,C\*]; C07F0009-00 [I,C\*];  
B01J0031-24 [I,A]; B01J0031-28 [N,A]; C07C0045-50

[I,A]; C07C0067-347 [I,A]; C07F0009-6568 [I,A]  
 ECLA B01J031/24; C07C045/50; C07C067/347+69/675;  
 C07C067/347+69/716; C07F009/6568C

OS MARPAT 140:310272

AB The present invention relates to a process for the hydroformylation of an optionally substituted ethylenically unsatd. compound by reaction thereof with carbon monoxide and hydrogen in the presence of a specific catalyst system. The specific catalyst system comprises (A) a source of group VIII metal cations, (B) a diphosphine ligand having the general formula  $X_1RX_2$ , (C) an acid with  $pK_a < 3$ , measured in an aqueous solution at 18° or a salt derived thereof, and (D) a source of halide anions, wherein  $X_1$ ,  $X_2$  = independently an optionally substituted cyclic group with  $\geq 5$  ring atoms, of which one is a phosphorus atom, and R = a bivalent optionally substituted bridging group, connected to each phosphorus atom by a  $sp^2$  hybridized carbon atom. Furthermore some specific bidentate diphosphines used in this process are described. Thus, 1,2-dibromobenzene 9.44, 1,4-diazabicyclo[2,2,2]octane 22.4, 9-phosphabicyclo[3.3.1]nonane 13.0, and tetrakis(triphenylphosphine)palladium 2.32 g were heated at 140° to give 7.10 g (yield 50%) 1,2-bis(9-phosphabicyclo[3.3.1]nonyl)benzene, 0.40 mmol of which was mixed with methane sulfonic acid 1.0, hydrochloric acid 0.20, and palladium acetate 0.25 mmol, and 20 mL 1-octene and heated at 120° for 5 h under 20 bar carbon monoxide and 40 bar hydrogen to give an alkanol product >99, a linear alkanol product 68, and a hydrogenation product <1%.

ST process hydroformylation ethylenically unsatd compd;  
 bisphosphabicyclononylbenzene ligand palladium acetate catalyst octene hydroformylation

IT Alkenes, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)  
 (C11-12; hydroformylation of ethylenically unsatd. compds.)

IT Ligands

RL: CAT (Catalyst use); USES (Uses)  
 (bidentate, diphosphines, hydroformylation catalyst  
 ligand; hydroformylation of ethylenically unsatd. compds.)

IT Hydroformylation

(hydroformylation of ethylenically unsatd. compds.)

IT Group VIII elements

RL: CAT (Catalyst use); USES (Uses)  
 (hydroformylation of ethylenically unsatd. compds.)

IT Catalysts

(hydroformylation; hydroformylation of ethylenically unsatd. compds.)

IT 676992-18-0 676992-19-1

RL: CAT (Catalyst use); USES (Uses)  
 (hydroformylation catalyst ligand; hydroformylation of ethylenically  
 unsatd. compds.)

IT 407578-79-4P, 9-Phosphabicyclo[3.3.1]nonane, 9,9'-(1,2-  
 phenylene)bis- 676992-15-7P 676992-16-8P

RL: CAT (Catalyst use); IMF (Industrial manufacture); PREP (Preparation);  
 USES (Uses)  
 (hydroformylation catalyst ligand; hydroformylation of ethylenically  
 unsatd. compds.)

IT 3375-31-3

RL: CAT (Catalyst use); USES (Uses)  
 (hydroformylation of ethylenically unsatd. compds.)

IT 4547-43-7P, Hexanoic acid, 6-hydroxy-, methyl ester 167707-57-5P,  
 Pentanoic acid, 5-hydroxy-4-methyl-, methyl ester 676992-17-9P

RL: IMF (Industrial manufacture); PREP (Preparation)  
 (hydroformylation of ethylenically unsatd. compds.)

IT 111-66-0, 1-Octene 630-08-0, Carbon monoxide, reactions  
 818-59-7 1333-74-0, Hydrogen, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)  
 (hydroformylation of ethylenically unsatd. compds.)

IT 583-53-9, 1,2-Dibromobenzene 3141-26-2, 3,4-Dibromothiophene  
 13887-02-0, 9-Phosphabicyclo[3.3.1]nonane 75415-78-0,  
 1,2-Dibromocyclopentene

RL: RCT (Reactant); RACT (Reactant or reagent)

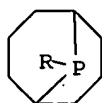
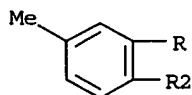
(reactant in hydroformylation catalyst ligand preparation; hydroformylation of ethylenically unsatd. compds.)

IT 676992-18-0

RL: RCT (Reactant); RACT (Reactant or reagent)  
(hydroformylation catalyst ligand; hydroformylation of ethylenically unsatd. compds.)

RN 676992-18-0 HCAPLUS

CN 9-Phosphabicyclo[3.3.1]nonane, 9,9'-(4-methyl-1,2-phenylene)bis- (9CI)  
(CA INDEX NAME)



L33 ANSWER 2 OF 3 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 2002:295834 HCAPLUS

DN 137:108974

ED Entered STN: 21 Apr 2002

TI Teaching a palladium polymerization catalyst to mono-oxygenate olefins

AU Drent, E.; Mul, W. P.; Budzelaar, P. H. M.

CS Shell Research and Technology Centre, Amsterdam, Amsterdam, Neth.

SO Comments on Inorganic Chemistry (2002), 23(2), 127-147

CODEN: COICDZ; ISSN: 0260-3594

PB Taylor & Francis Ltd.

DT Journal

LA English

CC 22-7 (Physical Organic Chemistry)

Section cross-reference(s): 51, 67

OS CASREACT 137:108974

AB Catalyst systems consisting of a palladium(II) diphosphine complex with weakly or non-coordinating counterions are efficient catalysts for the hydrocarbonylation of olefins. With these catalyst systems, the oxo-synthesis can be fully exploited to produce, at will, aldehydes/alcs. by hydroformylation or monoketones by hydro-acylation of olefins. The reactions described here constitute the first examples of selective formation of ketones by hydrocarbonylation of higher olefins and the first examples of Pd catalyzed hydroformylation of olefins. Variation of ligand, anion and/or solvent can be used to steer the reaction selectively towards aldehydes/ alcs., ketones or oligoketones. Non-coordinating anions and arylphosphine ligands produce primarily (oligo)ketones; increasing ligand basicity shifts selectivity towards monoketones, while increasing ligand basicity and/or increasing anion coordination strength leads to high selectivity for hydroformylation products, aldehydes and alcs. For the mechanisms of the aldehyde-producing step, we propose protonation of Pd(II)-acyl intermediates, assisted by the coordination of the anion, followed by reductive elimination of the aldehyde and heterolytic dihydrogen cleavage. For selective saturated monoketone formation we propose protonation at the Pd(II)-alkyl stage, now assisted by

APPLICANT

chelating carbonyl coordination followed by reductive elimination of the ketone and heterolytic dihydrogen cleavage. Unsatd. ketone formation involves  $\beta$ -hydride elimination from the same Pd(II)-alkyl intermediates.

ST olefin hydrocarbonylation hydroformylation palladium catalyst

IT Ligands

RL: CAT (Catalyst use); USES (Uses)

(bidentate phosphines; hydrocarbonylation of olefins using catalyst systems consisting of a palladium(II) diphosphine complex with weakly or non-coordinating counterions)

IT Alcohols, preparation

RL: SPN (Synthetic preparation); PREP (Preparation)

(formation under hydroformylation conditions; hydrocarbonylation of olefins using catalyst systems consisting of a palladium(II) diphosphine complex with weakly or non-coordinating counterions)

IT Addition reaction

Hydroaddition reaction catalysts

(hydroacylation; hydrocarbonylation of olefins using catalyst systems consisting of a palladium(II) diphosphine complex with weakly or non-coordinating counterions)

IT Hydroformylation

Hydroformylation catalysts

Regiochemistry

Solvent effect

(hydrocarbonylation of olefins using catalyst systems consisting of a palladium(II) diphosphine complex with weakly or non-coordinating counterions)

IT Alkenes, reactions

RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)

(hydrocarbonylation of olefins using catalyst systems consisting of a palladium(II) diphosphine complex with weakly or non-coordinating counterions)

IT Aldehydes, preparation

Ketones, preparation

RL: SPN (Synthetic preparation); PREP (Preparation)

(hydrocarbonylation of olefins using catalyst systems consisting of a palladium(II) diphosphine complex with weakly or non-coordinating counterions)

IT Chemoselectivity

(hydroformylation vs. hydroacylation; hydrocarbonylation of olefins using catalyst systems consisting of a palladium(II) diphosphine complex with weakly or non-coordinating counterions)

IT Anions

(ligand/anion effects on catalysis; hydrocarbonylation of olefins using catalyst systems consisting of a palladium(II) diphosphine complex with weakly or non-coordinating counterions)

IT Steric effects

(of phosphine ligand; hydrocarbonylation of olefins using catalyst systems consisting of a palladium(II) diphosphine complex with weakly or non-coordinating counterions)

IT Carbonylation

Carbonylation catalysts

(reductive; hydrocarbonylation of olefins using catalyst systems consisting of a palladium(II) diphosphine complex with weakly or non-coordinating counterions)

IT Synthesis gas

(selective production of ketones or aldehydes at will from olefins and syngas; hydrocarbonylation of olefins using catalyst systems consisting of a palladium(II) diphosphine complex with weakly or non-coordinating counterions)

IT Ketones, preparation

RL: SPN (Synthetic preparation); PREP (Preparation)

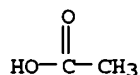
( $\alpha,\beta$ -unsatd.; hydrocarbonylation of olefins using catalyst systems consisting of a palladium(II) diphosphine complex with weakly

- or non-coordinating counterions)
- IT 76-05-1, Trifluoroacetic acid, uses 104-15-4, p-Toluenesulfonic acid, uses 1493-13-6, Trifluoromethanesulfonic acid  
RL: CAT (Catalyst use); USES (Uses)  
(anion precursor; hydrocarbonylation of olefins using catalyst systems consisting of a palladium(II) diphosphine complex with weakly or non-coordinating counterions)
- IT 3375-31-3, Palladium diacetate  
RL: CAT (Catalyst use); USES (Uses)  
(catalyst precursor; hydrocarbonylation of olefins using catalyst systems consisting of a palladium(II) diphosphine complex with weakly or non-coordinating counterions)
- IT 78-84-2P, Isobutyraldehyde 7786-29-0P,  $\alpha$ -Methyloctanal 27644-47-9P,  $\alpha$ -Propylhexanal 27649-40-7P,  $\alpha$ -Ethylheptanal  
RL: BYP (Byproduct); PREP (Preparation)  
(hydrocarbonylation of olefins using catalyst systems consisting of a palladium(II) diphosphine complex with weakly or non-coordinating counterions)
- IT 111-66-0, 1-Octene 115-07-1, Propene, reactions  
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)  
(hydrocarbonylation of olefins using catalyst systems consisting of a palladium(II) diphosphine complex with weakly or non-coordinating counterions)
- IT 123-72-8P, Butanal 124-19-6P, Nonanal 7379-12-6P, 2-Methyl-3-hexanone 53252-19-0P, 2-Methyl-4-hexen-3-one 62834-80-4P, 2-Methyl-1-hexen-3-one  
RL: SPN (Synthetic preparation); PREP (Preparation)  
(hydrocarbonylation of olefins using catalyst systems consisting of a palladium(II) diphosphine complex with weakly or non-coordinating counterions)
- IT 6737-42-4, 1,3-Bis(diphenylphosphino)propane 121115-33-1, 1,3-Bis(di-tert-butylphosphino)propane 131285-34-2, 1,3-Bis(dibutylphosphino)propane 143540-35-6, 1,3-Bis(di-sec-butylphosphino)propane 159460-98-7, 1,2-Bis(di-sec-butylphosphino)ethane  
RL: CAT (Catalyst use); USES (Uses)  
(ligand; hydrocarbonylation of olefins using catalyst systems consisting of a palladium(II) diphosphine complex with weakly or non-coordinating counterions)
- RE.CNT 18 THERE ARE 18 CITED REFERENCES AVAILABLE FOR THIS RECORD
- RE
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  - (18) Zuideveld, M; J Am Chem Soc 1998, V120, P7977 HCAPLUS
- IT 3375-31-3, Palladium diacetate  
RL: CAT (Catalyst use); USES (Uses); RCT (Reactant); RACT (Reactant or reagent)  
(catalyst precursor; hydrocarbonylation of olefins using catalyst systems consisting of a palladium(II) diphosphine complex with weakly

or non-coordinating counterions)

RN 3375-31-3 HCAPLUS

CN Acetic acid, palladium(2+) salt (8CI, 9CI) (CA INDEX NAME)



● 1/2 Pd(II)

L33 ANSWER (3 OF 3) HCAPLUS COPYRIGHT 2006 ACS on STN

AN 2001:851170 HCAPLUS

DN 135:371865

ED Entered STN: 23 Nov 2001

TI Bidentate ligands useful as carbonylation catalysts

IN Drent, Eit; Eberhard, Michael Rolf; Pringle, Paul Gerard

PA Shell Internationale Research Maatschappij BV, Neth.

SO PCT Int. Appl., 25 pp.

CODEN: PIXXD2

DT Patent

LA English

IC ICM C07F-0009/50

ICS C07F-0009/6568; C07F-0009/6571; C07C-0045/50; B01J-0031/24

CC 29-7 (Organometallic and Organometalloidal Compounds)

Section cross-reference(s): 45

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI WO2001087899	A1	20011122	2001WO-EP05625	20010516
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
CA---2408862	AA	20011122	2001CA-2408862	20010516
EP---1282629	A1	20030212	2001EP-0940491	20010516
EP---1282629	B1	20040204		
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR				
BR2001010882	A	20030610	2001BR-0010882	20010516
JP2003533534	T2	20031111	2001JP-0584292	20010516
AT---258936	E	20040215	2001AT-0940491	20010516
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ZA2002009309	A	20030729	2002ZA-0009309	20021115
PRAI 2000EP-0304171	A	20000517		
2001WO-EP05625	W	20010516		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
WO 2001087899	ICM	C07F-0009/50
	ICS	C07F-0009/6568; C07F-0009/6571; C07C-0045/50; B01J-0031/24
	IPCI	C07F0009-50 [ICM,7]; C07F0009-6568 [ICS,7]; C07F0009-6571 [ICS,7]; C07F0009-00 [ICS,7,C*]; C07C0045-50 [ICS,7]; C07C0045-00 [ICS,7,C*];



B01J0031-24 [ICS,7]; B01J0031-16 [ICS,7,C\*]  
 IPCR C07C0045-00 [I,C\*]; C07C0045-50 [I,A]; C07C0067-00 [I,C\*]; C07C0067-38 [I,A]; C07F0009-00 [I,C\*]; C07F0009-50 [I,A]; C07F0009-6568 [I,A]; C07F0009-6571 [I,A]  
 ECLA C07C045/50; C07F009/6568C; C07F009/6571L; C07C067/38+69/24; C07C067/38+69/54; C07F009/50A6  
 CA---2408862 IPCI C07F0009-50 [ICM,7]; B01J0031-24 [ICS,7]; B01J0031-16 [ICS,7,C\*]; C07C0045-50 [ICS,7]; C07C0045-00 [ICS,7,C\*]; C07F0009-6568 [ICS,7]; C07F0009-6571 [ICS,7]; C07F0009-00 [ICS,7,C\*]  
 EP---1282629 IPCI C07F0009-50 [ICM,7]; C07F0009-6568 [ICS,7]; C07F0009-6571 [ICS,7]; C07F0009-00 [ICS,7,C\*]; C07C0045-50 [ICS,7]; C07C0045-00 [ICS,7,C\*]; B01J0031-24 [ICS,7]; B01J0031-16 [ICS,7,C\*]  
 IPCR B01J0031-16 [I,C\*]; B01J0031-24 [I,A]; C07C0045-00 [I,C\*]; C07C0045-50 [I,A]; C07F0009-00 [I,C\*]; C07F0009-50 [I,A]; C07F0009-6568 [I,A]; C07F0009-6571 [I,A]  
 BR2001010882 IPCI C07F0009-50 [ICM,7]; C07F0009-6568 [ICS,7]; C07F0009-6571 [ICS,7]; C07F0009-00 [ICS,7,C\*]; C07C0045-50 [ICS,7]; C07C0045-00 [ICS,7,C\*]; B01J0031-24 [ICS,7]; B01J0031-16 [ICS,7,C\*]  
 IPCR C07C0045-00 [I,C\*]; C07C0045-50 [I,A]; C07C0067-00 [I,C\*]; C07C0067-38 [I,A]; C07F0009-00 [I,C\*]; C07F0009-50 [I,A]; C07F0009-6568 [I,A]; C07F0009-6571 [I,A]  
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 IPCR C07C0045-00 [I,C\*]; C07C0045-50 [I,A]; C07C0067-00 [I,C\*]; C07C0067-38 [I,A]; C07F0009-00 [I,C\*]; C07F0009-50 [I,A]; C07F0009-6568 [I,A]; C07F0009-6571 [I,A]  
 AT----258936 IPCI C07F0009-50 [ICM,7]; C07F0009-6568 [ICS,7]; C07F0009-6571 [ICS,7]; C07F0009-00 [ICS,7,C\*]; C07C0045-50 [ICS,7]; C07C0045-00 [ICS,7,C\*]; B01J0031-24 [ICS,7]; B01J0031-16 [ICS,7,C\*]  
 ES---2210170 IPCI C07F0009-50 [ICM,7]; C07F0009-6568 [ICS,7]; C07F0009-6571 [ICS,7]; C07F0009-00 [ICS,7,C\*]; C07C0045-50 [ICS,7]; C07C0045-00 [ICS,7,C\*]; B01J0031-24 [ICS,7]; B01J0031-16 [ICS,7,C\*]  
 US2002016484 IPCI C07F0009-72 [ICM,7]; C07F0009-90 [ICS,7]; C07F0009-28 [ICS,7]; C07F0009-00 [ICS,7,C\*]  
 IPCR C07C0045-00 [I,C\*]; C07C0045-50 [I,A]; C07C0067-00 [I,C\*]; C07C0067-38 [I,A]; C07F0009-00 [I,C\*]; C07F0009-50 [I,A]; C07F0009-6568 [I,A]; C07F0009-6571 [I,A]  
 NCL 556/070.000  
 ECLA C07C045/50; C07C067/38+69/54; C07C067/38+69/24; C07F009/50A6; C07F009/6568C; C07F009/6571L  
 ZA2002009309 IPCI B01J [ICM,7]; C07C [ICS,7]; C07F [ICS,7]  
 OS CASREACT 135:371865; MARPAT 135:371865  
 AB The invention describes bidentate ligands of formula R1R2M1-R-M2R3R4, wherein M1 and M2 are independently P, As or Sb; R1, R2, R3 and R4 independently represent tertiary alkyl groups, or R1 and R2 together and/or R3 and R4 together represent an optionally substituted bivalent cycloaliph. group whereby the two free valencies are linked to M1 or M2, and R represents a bivalent aliphatic bridging group containing from 2 to 6 atoms in the bridge, which is substituted with two or more substituents. Use of such a catalyst system in a process for the carbonylation of optionally substituted alkenes and alkynes by reaction with carbon monoxide and a coreactant is described. Thus, propene is hydroformylated by pressurization with carbon monoxide and hydrogen in the presence of

platinum(II) acetylacetonate and meso (R,S) 2,3-bis(cyclooctylenephosphino)butane to give 99% n-butyraldehyde.

ST alkene hydroformylation platinum diphosphine cocatalyst; alkanol esterification platinum palladium diphosphine cocatalyst; platinum diphosphine carbonylation cocatalyst; palladium diphosphine carbonylation cocatalyst; aldehyde prepn; ester prepn

IT Alcohols, reactions  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (aliphatic; esterification of alkanols catalyzed by platinum or palladium diphosphine cocatalysts)

IT Ligands  
 RL: CAT (Catalyst use); USES (Uses)  
 (bidentate; carbonylation reactions of alkenes and alkanols catalyzed by platinum or palladium diphosphine cocatalysts)

IT Esterification catalysts  
 (esterification of alkanols catalyzed by platinum or palladium diphosphine cocatalysts)

IT Hydroformylation catalysts  
 (hydroformylation of alkenes catalyzed by platinum diphosphine cocatalysts)

IT Alkenes, reactions  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (hydroformylation of alkenes catalyzed by platinum diphosphine cocatalysts)

IT Esterification  
 (of alkanols catalyzed by platinum or palladium diphosphine cocatalysts)

IT Hydroformylation  
 (of alkenes catalyzed by platinum diphosphine cocatalysts)

IT 3375-31-3 15170-57-7, Platinum acetylacetonate 153280-11-6 374557-18-3  
 RL: CAT (Catalyst use); USES (Uses)  
 (carbonylation reactions of alkenes and alkanols catalyzed by platinum or palladium diphosphine cocatalysts)

IT 123-72-8P, n-Butyraldehyde 141-32-2P 590-01-2P  
 RL: IMF (Industrial manufacture); SPN (Synthetic preparation); PREP (Preparation)  
 (carbonylation reactions of alkenes and alkanols catalyzed by platinum or palladium diphosphine cocatalysts)

IT 71-36-3, Butanol, reactions 74-85-1, Ethene, reactions 74-86-2, Acetylene, reactions 79-09-4, Propionic acid, reactions 115-07-1, Propene, reactions  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (carbonylation reactions of alkenes and alkanols catalyzed by platinum or palladium diphosphine cocatalysts)

RE.CNT 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

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(2) Mason, R; US---3527818 A 1970

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(5) Shell Internationale Research Maatschappij BV; WO---9842717 A 1998 HCAPLUS

IT 3375-31-3  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (carbonylation reactions of alkenes and alkanols catalyzed by platinum or palladium diphosphine cocatalysts)

RN 3375-31-3 HCAPLUS

CN Acetic acid, palladium(2+) salt (8CI, 9CI) (CA INDEX NAME)